HOGAN & HARTSON L.L.P.

COLUMBIA SQUARE
555 THIRTEENTH STREET NW
WASHINGTON DC 20004-1109
(202) 637-5600

BRUSSELS
LONDON
PARIS
PRAGUE
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BALTIMORE, MD
BETHESDA, MD
McLEAN, VA

JOEL S. WINNIK
PARTNER
DIRECT DIAL (202) 637-5857

April 4, 1996

BY HAND DELIVERY

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, D.C. 20554

Re: Written Ex Parte Presentation
IB Docket No. 95-91
GEN Docket No. 90-357
RM No. 8610
PP-24
PP-86
PP-87

Dear Mr. Caton:

This is to advise that, on April 4, 1996, Richard G. Gould submitted by fax the attached letter, written on behalf of Cracker Barrel Old Country Store, Inc., to Ronald Repasi, Electronics Engineer, International Bureau. Mr. Gould prepared the letter to address questions that Mr. Repasi had asked him during Cracker Barrel's March 29, 1996 ex parte presentation to members of the staff of the International Bureau regarding certain proposals related to the establishment of a satellite-delivered Digital Audio Radio Service (DARS), as raised in the Notice of Proposed Rulemaking (released June 15, 1995) in the above-referenced dockets.

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An original and twelve copies of this letter and enclosure are being filed with your office today.

Sincerely,

Joel S. Winnik KMW

Joel S. Winnik
Counsel for Cracker Barrel Old Country Store, Inc.

Enclosure

cc: Ronald Repasi, Electronics Engineer, International Bureau
Scott Blake Harris, Chief, International Bureau
Roderick K. Porter, Deputy Chief
Thomas Tycz, Chief, Satellite and Radiotelecommuncation Division
Rosalee Chiara, Attorney Advisor
John Stern, Senior Legal Advisor

TELECOMMUNICATIONS SYSTEMS

1629 K Street, N.W., Suite 600
Washington, D.C. 20006
(202) 223-4449 • Fax: (202) 223-4450
E-Mail: rgould@nes.edu

April 4, 1996

Mr. Ronald Repasi
International Bureau
FCC
2000 M Street, NW
Washington, DC 20554

Ex parte written presentation of Cracker Barrel in IB Docket No. 95-91

Dear Ron:

This letter responds to the questions you posed during the ex parte presentation of Cracker Barrel on March 29.

You asked about the cost of codecs I described during the meeting. Those codecs, of the kind now being manufactured by Comstream and used in BSS systems, incorporate concatenated coding using 1/2 rate "inner" convolutional FEC coding and Reed-Solomon "outer" block encoding. With an energy per bit to noise ratio (E_b/N_o) of only 3.2 dB, they produce a bit error rate of 10^{-10}. According to Comstream, these codecs do not cost any more than codecs of lesser performance, including those using rate 1/4 or 1/3 convolutional codes.

I can also provide a fuller explanation of why 1/4 and 1/3 rate coding is not only a poor trade-off of bandwidth for power (1/4 rate increases the occupied bandwidth by 33% over 1/3 rate for a minimal theoretical saving in power), but why, in practice, the power saving is not realized because of the extreme sensitivity of the demodulator to small decreases in signal power.

At the input to the demodulator within a receiver, the term "energy per bit" in the quantity (E_b/N_o) refers to information bits only. Thus, if the (E_b/N_o) of a 1/2 rate encoded signal is 3.2 dB at the input to the receiver, the energy per information bit at the input to the demodulator is actually 3 dB less: 3.2 - 3 = 0.2 dB. With a 1/4 rate encoded signal, the energy per information bit at the input to the demodulator is actually 6 dB less than the (E_b/N_o) at the input to the receiver. Thus, if the (E_b/N_o) of a 1/4 rate encoded signal at the input to a receiver is also 3.2 dB, the energy per information bit to noise ratio at the input to the demodulator would actually be 3.2 - 6 = -2.8 dB. Not only must demodulators capable of working at such low levels be much more complex, but they have a much sharper threshold, making them much more sensitive to fading and multipath.

Sincerely,

Richard G. Gould